

# Effect of restricted feed access time on broiler chickens: a live performance

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## Abstract

300 broiler chickens of 4 weeks old were used to investigate the effect of restricted feed access time on broiler chickens in the finisher phase. The birds had 3, 6, 9 and 12 hours access time to feed while water was provided *ad libitum* for 4 weeks. Results indicate non significant ( $P > 0.05$ ) differences for average weekly feed intake, heart weight, spleen weight and mortality. Results also indicate significant ( $P < 0.05$ ) differences for total feed consumed, total feed cost and feed conversion ratio. Average weekly weight gain, weekly live weight, final live weight, and dressed weight were significantly ( $P < 0.05$ ) different. Also indicated in the results are significant ( $P < 0.05$ ) differences in gizzard weight and live weight. This study recommends the feeding of broiler chickens for 9 hours daily.

**Keywords:** Feed restriction; Access time; Broiler chickens; live performance.

## Introduction

The high cost of meat and egg in Nigeria has been attributed to livestock production costs, which ultimately increase the price of the finished products. The interaction between production costs and meat output culminates in the production of insufficient quantity of meat and egg. This in turn accentuates the shortage of animal protein to the populace.

With the widening protein deficiency gap due to high population and high cost of livestock production, there is the need to reduce production cost through feed cost savings. This is to allow the products go round the population at affordable prices. The benefits of feed savings, feed conversion rates, lean meat and a more uniform growth are worth serious consideration. This can be done by finding ways of reducing feed cost. Quantitative and qualitative feed restrictions have been introduced. This is done by reducing the birds feed access time or by reducing the nutrient content of the feed. Restricted feeding can be done in early life of chickens (Lee & Leeson, 2001).

The benefits of feed restriction include reduced mortality as it slows down fast growth to reduce mortality (Tumova, 1993), including preascites and

ascites (Acar *et al.*, 1995). Feed restriction decreases mortality caused by “sudden death syndrome” (Lippens *et al.*, 2000). It also encourages compensatory growth which enables full recovery of body weight (Tumova, 2002). Zhan *et al.* (2007) and Camacho *et al.* (2004), Sahraei and Shariatmadari (2007) reported that the feed restriction increases feed intake. The higher feed intake can be related to the hypertrophy of the gastrointestinal tract that occurs after the restriction period, when the birds are fed *ad libitum*. Feed restriction improves feed efficiency in chickens which could be attributed to reduced overall maintenance requirements caused by a transient decrease in basal metabolic rate. However, the improved feed efficiency can also be related to higher feed intake and to the hypertrophy of the gastrointestinal tract that occurs after the restriction (Rincon & Leeson, 2002).

This study investigated quantitative feed restriction to establish the beneficial feed access time for broiler chicken production. It was intended to investigate feed restriction during the finisher phase other than the conventional starter phase where compensatory growth is expected.

### Materials and Methods

A total of 300 broiler chickens were used for this study. The chickens were brooded under the conventional deep litter system for 4 week for adaptation before being allotted into the different treatment pens and replicates at the beginning of week 5. There were a total of 4 treatments with 75 chickens each. The treatments were constituted of 3 replicates of 25 chickens each.

The treatments were restricted feeding time of 3,6,9 and 12 hours feed access time, only by day. Water was given *ad libitum* throughout the trial period of 4 weeks. Birds were fed commercial broiler finisher feed of 21 percent crude protein and 2700 ME (kcal/kg).

Data were taken and recorded on feed intake and weight gain. At the end of the trial period 2 chickens were randomly selected from each of the replicate pens and slaughtered for carcass characteristics.

All data collected were subjected to One-way analysis of Variance and mean separation using Minitab (1996).

### Results and Discussion

Table 1. Effect of restricted feed access time on feed intake in broiler chickens

Parameter	3hrs	6hrs	9hrs	12hrs	±SEM
AWFC(Kg)	1.172	1.456	1.744	1.936	0.3700
TFC (Kg)	1.849 <sup>c</sup>	2.290 <sup>b</sup>	2.290 <sup>b</sup>	3.112 <sup>a</sup>	0.4122
FCR	1.06 <sup>a</sup>	1.16 <sup>a</sup>	1.23 <sup>b</sup>	1.35 <sup>c</sup>	0.4328
CFC (₹/Kg)	18.64 <sup>a</sup>	23.13 <sup>b</sup>	27.17	31.41 <sup>c</sup>	3.4324

Means along rows without superscript are not significantly ( $P>0.05$ ) different. AWFC (Average weekly feed consumption), TFC (Total feed consumption), FCR (Feed conversion ratio), CFC (Cost of feed consumed).

From Table 1, average weekly feed consumption (AWFC) was not significantly ( $P>0.05$ ) different. Birds consumed as much feed as they could within the restriction time. The total feed consumed (TFC), feed conversion ratio (FCR) and the cost of feed consumed (CFC) during the trial period were significantly ( $P<0.05$ ) different. This could be attributed to the numerical differences in weekly feed consumption. Birds developed large crops to accommodate the increased feed intake within the restriction time. This result agrees with Sharei and

Shariamadari (2007) which reported that feed restriction increases feed intake. The result of this study also shows that birds in the highest restriction level converted more feed to meat. This report agrees with (Rincon & Leeson, 2002) which attributed improved feed efficiency to higher feed intake and to the hypertrophy of the gastrointestinal tract that occurs after the restriction. This hypertrophy of the gastrointestinal tract could implicate increased nutrient absorption surface which ultimately increased nutrient absorption.

Table 2. Effect of restricted feed access time on weight gains in broiler chickens

Parameter	3hrs	6hrs	9hrs	12hrs	±SEM
AWWG(Kg)	0.437 <sup>c</sup>	0.495 <sup>b</sup>	0.535 <sup>b</sup>	0.575 <sup>a</sup>	0.5854
WLW (Kg)	0.186 <sup>c</sup>	0.333 <sup>b</sup>	0.348 <sup>b</sup>	0.339 <sup>b</sup>	0.1200
FLW(Kg)	1.75 <sup>b</sup>	1.98 <sup>b</sup>	2.14 <sup>a</sup>	2.30 <sup>a</sup>	0.0321
DW(Kg)	1.06 <sup>c</sup>	1.43 <sup>b</sup>	1.48 <sup>a</sup>	1.52 <sup>a</sup>	0.0735

Means along rows without superscript are not significantly ( $P>0.05$ ) different. AWWG (Average weekly weight gain), WLW (Weekly live weight), FLW (Final live weight), and DW (Dressed weight)

From Table 2, all growth parameters studied were significantly ( $P<0.05$ ) different. This could be attributed to significant ( $P<0.05$ ) differences in feed intake and feed efficiency. The numeric differences depict levels of restriction. Those that received less feed performed less. This implies that feed restriction at the finisher phase does not encourage compensatory growth. Compensatory growth could come if the restriction was early. There was no mortality recorded during the trial. This agrees with Tumova (1993), which reported that feed restriction reduced mortality as it slows down fast growth. This could be attributed to the development of a more compact body that impedes disease infection.

Table 3. Effect of restricted feed access time on carcass characteristics in broiler chickens

Parameter	3hrs	6hrs	9hrs	12hrs	±SEM
HW(g)	18	20	20	21.7	1.1971
SW (g)	10	10.6	11	11.7	0.8463
GW(g)	37.2 <sup>b</sup>	46.7 <sup>a</sup>	50 <sup>a</sup>	55 <sup>a</sup>	3.2700
LW (g)	53.3 <sup>c</sup>	66.7 <sup>b</sup>	71.7 <sup>a</sup>	73.3 <sup>a</sup>	7.7901
MORT.	0.0	0.0	0.0	0.0	-

Means along rows without superscript are not significantly ( $P>0.05$ ) different. HW (Heart weight), SW (Spleen weight), GW (Gizzard weight), LW (Live weight) and MORT. (Mortality).

From Table 3, the weights of the heart and the spleen were not significantly ( $P>0.05$ ) different. It implies that feed restriction in the finisher phase has no effect on the heart and spleen at the levels of restriction studied. However, there were significant ( $P<0.05$ ) differences in the gizzard and liver weights. Birds with the least access time to feed had heavier gizzard and liver weights. This could be attributed to increased metabolic functions due to increased feed intake.

#### Conclusion

Feed restriction in the finisher phase is beneficial as it reduces production cost and mortality. It also produces a more uniform weight for the crop. This study recommends the feeding of broiler chickens for 9 hours daily. This is because of its closeness to the 12 hours feed access time in final live weights and dressed weights.

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